

Application No. 10/806,495  
Office Action mailed: November 2, 2006  
Response to Office Action date: December 20, 2006

### **REMARKS**

In this Response to the Office action, no changes have been made to the claims. Accordingly, claims 27, 28 and 44-70 remain pending. Applicants respectfully request further consideration of these claims, in view of the following remarks.

#### **Amendments to the Specification**

The amendments to the specification in paragraphs [0001], [0003], [0004], and [0045] are made to correct obvious spelling errors.

#### **Examiner Interview**

Applicants thank the Examiner for the courtesy of an interview on December 12, 2006, during which Applicants attorney, Paul A. Stone (Reg. No. 38,628) and the Examiner discussed the issues raised in the outstanding Office action. In particular, Applicants' representative proposed arguments responsive to the Office action demonstrating that the as-claimed inventions are patentably distinct from the disclosure of U.S. Patent No. 3,930,810 to Gattuso. As noted in the Interview Summary dated December 12, 2006, the Examiner agreed with Applicants' response.

#### **Rejections Under 35 U.S.C. § 102(b) – US 3930810 (Gattuso)**

The Office action rejects claims 27, 28 and 44-70 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,930,810 to Gattuso. Specifically, Gattuso is said to teach a polymer composition comprising a crosslinked amine polymer formed by mixing an epihalohydrin and an N-alkylpolyamine. Gattuso is also said to disclose the use of various diamines, including the use of 1,3-diaminopropanes and the crosslinker epichlorohydrin. See paragraph 4 at page 3 of the Office action. The Office acknowledges that Gattuso does not disclose all the characteristics and properties of the claimed polymeric composition, but nonetheless asserts that the properties claimed in the present invention would have been inherent in the polymeric composition disclosed by Gattuso. The Office action reasons that the present invention is "based on substantially identical process using

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substantially identical polymamines and crosslinker". See paragraph 4 at page 3 of the Office action. See also paragraph 6 at page 4 of the Office action.

Applicants respectfully traverse these rejections.

The rejection is improper because, as explained in detail below, Gattuso discloses polymers prepared only from N-alkylpolyamine monomers which are different than the polyamine monomers recited in Applicants' claims. The disclosure of one species does not anticipate another species. Although Gattuso also discloses generic classes of monomers, such as N-alkylpolyamines and primary amines, the disclosure of a genus does not anticipate a more specifically-claimed species.

Further, the Office's position regarding inherent anticipation is misplaced. Since the polymeric compositions claimed by Applicants are derived from amine monomers having a different structure than the N-alkylpolyamines disclosed in Gattuso, the polymerization reaction disclosed by Gattuso could not have resulted in the polymer being claimed by Applicants.

Accordingly, the inventions defined by the presently-pending claims are not anticipated by U.S. Patent No. 3,930,810 to Gattuso. Applicants respectfully request that this basis for rejection be withdrawn.

#### Rejections Under 35 U.S.C. § 103(a) – US 3930810 (Gattuso)

The Office action also rejects each of the pending claims 27, 28 and 44-70 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 3,930,810 to Gattuso. See paragraphs 4 and 7, at pages 3 and 5-6 of the Office action, respectively. The Office reasons "it appears that the claimed polymeric composition are within the generic disclosure of Gattuso and a person of ordinary skill in the art would have expected all embodiment(s) of Gattuso to have similar properties."

Applicants respectfully traverse these rejections.

The Office has not established *prima facie* obviousness, because the reasoning set forth in the Office is factually and legally insufficient.

Gattuso

In particular, Gattuso discloses additives for petroleum distillates, in which the disclosed additive formulations comprise, as a first component, a solution of the polymeric reaction product of an epihalohydrin and an N-alkylpolyamine in an aromatic solvent. *See* Col. 2, lines 35-43. The only N-alkylpolyamines disclosed by Gattuso are those in which the alkyl group contains at least 12 carbon atoms. (*See* Col. 2, lines 47-52). Specific polyamine monomers disclosed in Gattuso include, for example:

- N-dodecyl-1,3diaminopropane (with N-alkyl moiety = C<sub>12</sub>)
- N-eicosyl-1,3diaminopropane (with N-alkyl moiety = C<sub>20</sub>)
- N-triacontyl-1,3diaminopropane (with N-alkyl moiety = C<sub>30</sub>)
- N-tetracontyl-1,3diaminopropane (with N-alkyl moiety = C<sub>40</sub>)

among others, but in each case having long-chain N-alkyl moieties (*i.e.*,  $\geq$  C<sub>12</sub>). Gattuso also discloses, for example, N-alkylpolyamine monomers such as N-tallow-1,3diaminopropane (with N-alkyl moiety predominantly C<sub>16</sub> - C<sub>18</sub>), N-coco-1,3diaminopropane (with N-alkyl moiety predominantly C<sub>14</sub> - C<sub>16</sub>); and N-soya-1,3diaminopropane.

In the N-alkylpolyamines disclosed in Gattuso, the polyamine group is a straight chain of at least three carbon atoms attached to the nitrogen atom. (*See* Col. 2, lines 47-52). Specific polyamine groups disclosed in Gattuso include 1,3diaminopropane, and other straight-chain polyamines having longer chain lengths – *e.g.*, chain lengths approximating that of a C<sub>21</sub> alkyl moiety, such as the N-alkylpolyamine of –N(R)-C<sub>4</sub>-N-C<sub>4</sub>-N-C<sub>4</sub>-N-C<sub>4</sub>-NH, where R is an alkyl with  $\geq$  C<sub>12</sub>. Particularly disclosed straight-chain polyamine groups include, for example, diaminobutanes, diaminopentanes, diaminohexanes, and various polyethyleneimines such as diethylene triamines, dipropylene triamines, dibutylene triamines, triethylene tetramines, tripropylene tetramines, tributylene tetramines, tetraethylene pentamines, tetrapropylene pentamines, and tetrabutylene pentamines. (*See* Col. 3, lines 16-54).<sup>1</sup>

<sup>1</sup> The additive formulation disclosed in Gattuso is also said to comprise, as a second component, the polymeric reaction product of an epihalohydrin and a primary alkylamine – specifically a primary alkyl(mono)amine – in which the alkyl moiety contains at least 12 carbon atoms. *See* Col. 5, lines 18-39. The polymer of such second component is likewise distinguished from Applicants' invention.

**Applicants' Invention**

In contrast, the inventions defined by the presently-pending claims are polymeric compositions comprising a crosslinked amine polymer having repeat units derived from polymerization of a polyamine monomer particularly defined in independent claims 27, 44, 47 and 65 – generally selected from one or more of:

- N, N, N', N'-tetrakis(3-aminopropyl)-1,3diaminopropane;
- N, N, N', N'-tetrakis(3-aminopropyl)-1,4diaminobutane; and
- N, N, N', N'-tetrakis(3-aminopropyl)-1,5diaminopentane.

Hence, Applicants' polyamine monomers are structurally and chemically different from any monomer disclosed by Gattuso. As such, the polymeric compositions of the present inventions each comprise a crosslinked amine polymer comprising repeat units with different molecular structure and different chemical properties than any repeat unit disclosed by Gattuso. Moreover, as explained below, the compositions as claimed by Applicants would not have been obvious to a person of ordinary skill in the art.

**Applicants' Inventions are Not Obvious**

Contrary to the contentions set forth in the Office action, the polyamine monomers disclosed in Gattuso are not “substantially identical” to the polyamine monomers of Applicants' invention. In fact, a skilled person would have understood that the polymer derived from polymerization of the specific polyamine monomers as claimed by Applicant would have significant structural and chemical differences from the polymeric reaction product of an epihalohydrin and N-alkylpolyamines as disclosed by Gattuso. In particular, the crosslinked polymer product resulting from polymerization of the polyamine monomers as claimed by Applicant is substantially branched, with an extent and spatial regularity of branching being derived from the recited amine monomers. In contrast, the skilled person would have understood that the polymeric product resulting from polymerization with monomers disclosed in Gattuso having straight-chain polyamine groups under the reaction conditions disclosed in Gattuso would have had random, less substantial branching, if any. This is substantiated, for example, in that the polymers disclosed in Gattuso are soluble polymers. (See, for example, Col. 1, lines 63-68). Moreover, the skilled person would not have

disregarded the long-chain alkyl substituents in the disclosed N-alkylpolyamine monomers, and in fact, would have understood that such long chain ( $\geq C_{12}$ ) alkyl moieties of the N-alkylpolyamines disclosed by Gattuso would substantially affect the chemical nature of the resulting polymeric product (e.g., contributing to the hydrophobicity to the macromolecule).

In view of such structural and chemical differences, the polymeric composition claimed by Applicants would not have been expected to have similar properties to the polymeric reaction product disclosed in Gattuso. In fact, the differences in polymer properties are substantial and commercially significant, especially for example in the context of certain preferred embodiments of Applicants' invention in which the polymeric compositions are suitable for use in pharmaceutical compositions for binding phosphate ion. Therefore, the reasoning set forth in the Office action is not supported by the facts, and cannot sustain a determination of *prima-facie* obviousness.

Moreover, the position asserted by the Office is legally insufficient to establish a *prima facie* case of obviousness. There is no legal basis for the Office to rely on inherency (e.g., of the polymer or the polymer characteristics or properties) in the context of an obvious determination.<sup>2</sup> Also, the Office does not adequately explain why a person of ordinary skill in the art would have been motivated to modify Gattuso's polymers in a manner that would have led to the polymeric compositions defined by Applicants' claims. Gattuso is directed toward compositions as additives for enhancing petroleum distillates. The mere commonality of polymerizing polyamine monomers is insufficient under the law to provide the requisite motivation. Further, the Office does not explain how the Gattuso polymer could have been modified by a person of ordinary skill in the art without having rendered the Gattuso polymer unsuitable for its intended purpose as a petroleum distillate additive. In view of the lack of motivation and other deficiencies noted above, the Office action appears to be relying on improper hindsight.

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<sup>2</sup> Courts have long held that inherency and obviousness are entirely different questions. "That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown." *In re Shetty*, 195 USPQ 753 (CCPA 1977) quoting *In re Spormann* 150 USPQ 449 (CCPA 1966). See also *In re Rijckaert*, 28 USPQ2d 1955 (Fed. Cir. 1993).

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Hence, the Office action does not establish that the inventions defined by independent claims 27, 44, 47 and 65, together with claims depending therefrom, would have been *prima facie* obvious. Accordingly, Applicants respectfully request withdrawal of this basis for rejection.

Information Disclosure Statement

An Information Disclosure Statement is being filed on the date even herewith listing a published US application US 2002/028887 and a Japanese reference, JP 2003155429, together with a copy of an English language translation thereof. An English-language Abstract of this reference was previously submitted by Applicants on December 1, 2006. Consideration of the pending claims is respectfully requested, in particular, in view of the newly cited reference.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested. Applicants believe that no further fees are required in connection with the instant amendment. If necessary, however, the Examiner is hereby authorized to charge any fees required in connection with this application to Deposit Account No. 23-2415 (Docket No. 29329-749.201).

Respectfully submitted,

Date: 12/20/06

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